

CLAIMS

1. Manufacturing process of detachable substrates, the said process comprising a surface condition adjustment treatment of at least one of two layers of material (20), followed by the reversible bonding of the  
5 surfaces of the two layers to make the detachable substrate, characterised in that the said surface condition adjustment treatment comprises the bombardment of the surface to be treated with ion clusters.

2. Process according to the previous claim,  
10 characterised in that the bombarded ions comprise species that are chemically inert in relation to the surface to be treated.

3. Process according to the previous claim, characterised in that the layer of material whose surface  
15 condition is to be adjusted is made of silicon or of silicon carbide, and the bombarded ions are argon or nitrogen ions.

4. Process according to one of the three previous claims, characterised in that the said ions comprise ions  
20 that are capable of chemically reacting with the material of the surface to be treated.

5. Process according to the previous claim, characterised in that the bombardment is carried out from a plasma containing the said ions.

25 6. Process according to the previous claim, characterised in that the materials of the surface to be treated and the element making the plasma form one of the following pairs: (Si, SF<sub>6</sub>), (SiC, SF<sub>6</sub>/O<sub>2</sub>), (SiO<sub>2</sub>, SF<sub>6</sub>/O<sub>2</sub>), (SiO<sub>2</sub>, CHF<sub>3</sub>/SF<sub>6</sub>), (Si<sub>3</sub>N<sub>4</sub>, CHF<sub>3</sub>/O<sub>2</sub>/SF<sub>6</sub>).

7. Process according to one of the previous claims, characterised in that the process comprises the control of the number of ions in the clusters for the adjusting of the roughness of the surface to be treated, either  
5 with the aim of increasing or reducing this surface.

8. Process according to the previous claim, characterised in that the said control is carried out so as to smoothen the said surface to bring its roughness to a value that enables bonding via molecular adhesion.

10 9. Process according to the previous claim, characterised in that the surface is a negative surface of a SMARTCUT<sup>®</sup> type process that is recycled.

10. Process according to one of the three previous claims, characterised in that the said control of the  
15 number of ions is achieved via the control of the pressure of an ion source allowing the generating of ion clusters.

11. Process according to one of the previous claims, characterised in that the process also comprises the  
20 control of the bombardment voltage applied to the ions.

12. Process according to one of the previous claims, characterised in that the surface to be treated is selectively and locally treated in desired zones by selectively directing towards the zones to be treated the  
25 beam of ion clusters, so as to create on this surface a pattern according to which the surface condition is selectively adjusted in the desired manner.

13. Process according to one of the previous claims, characterised in that a focalised beam is created,  
30 comprising the ions to be bombarded as well as the monomer species of these ions, and the part of the beam comprising the ion clusters is directed towards the layer.

14. Process according to the previous claim, characterised in that the impact site of the said beam of ion clusters on the layer is controlled.

5 15. Process according to the previous claim, characterised in that an appropriate spatial pattern is created on the surface of the layer, with an adjusted roughness in comparison with that of the rest of the surface of the layer.

10 16. Process according to the previous claim in conjunction with claim 7, characterised in that patterns with variable roughness are created on the surface of the layer.